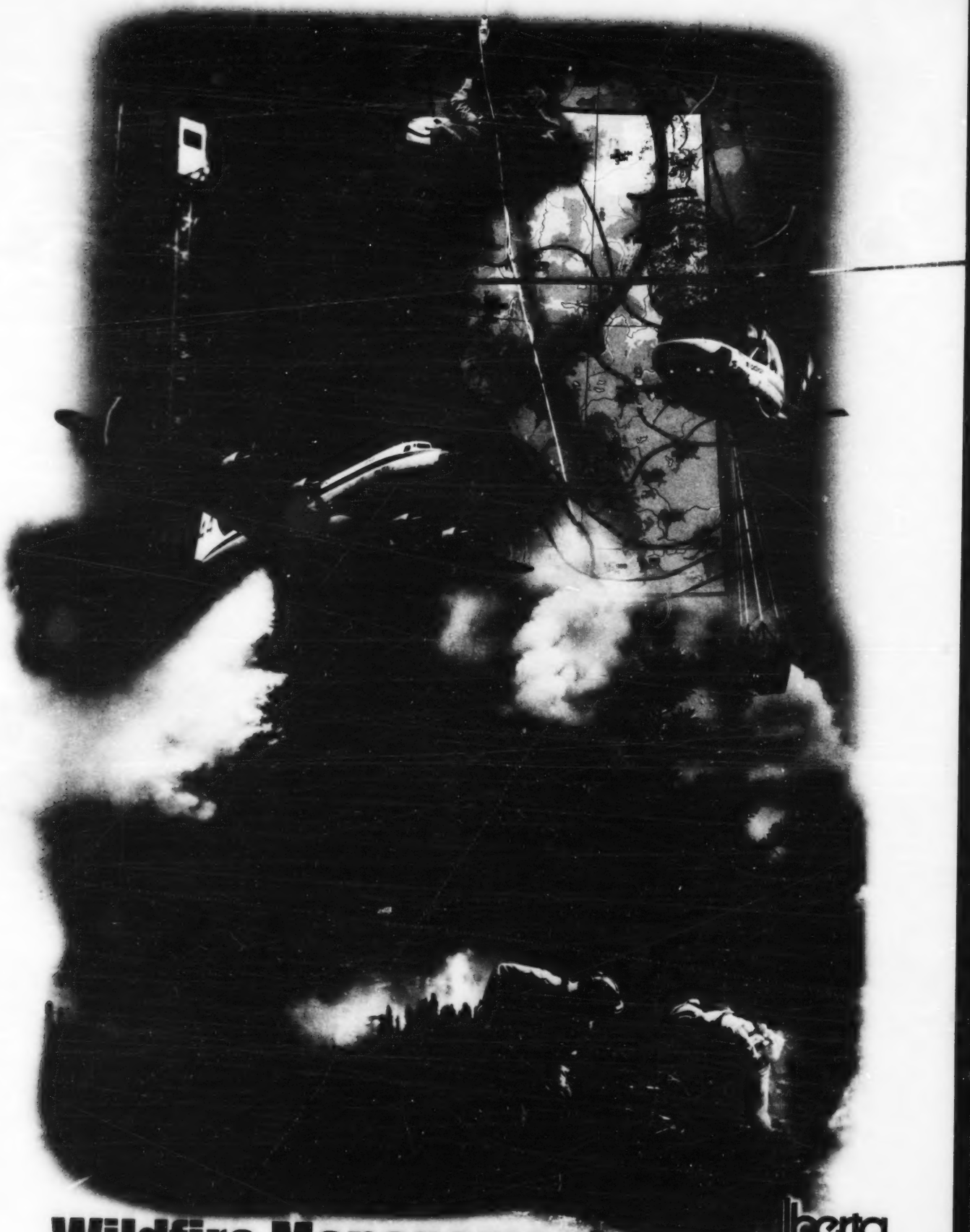
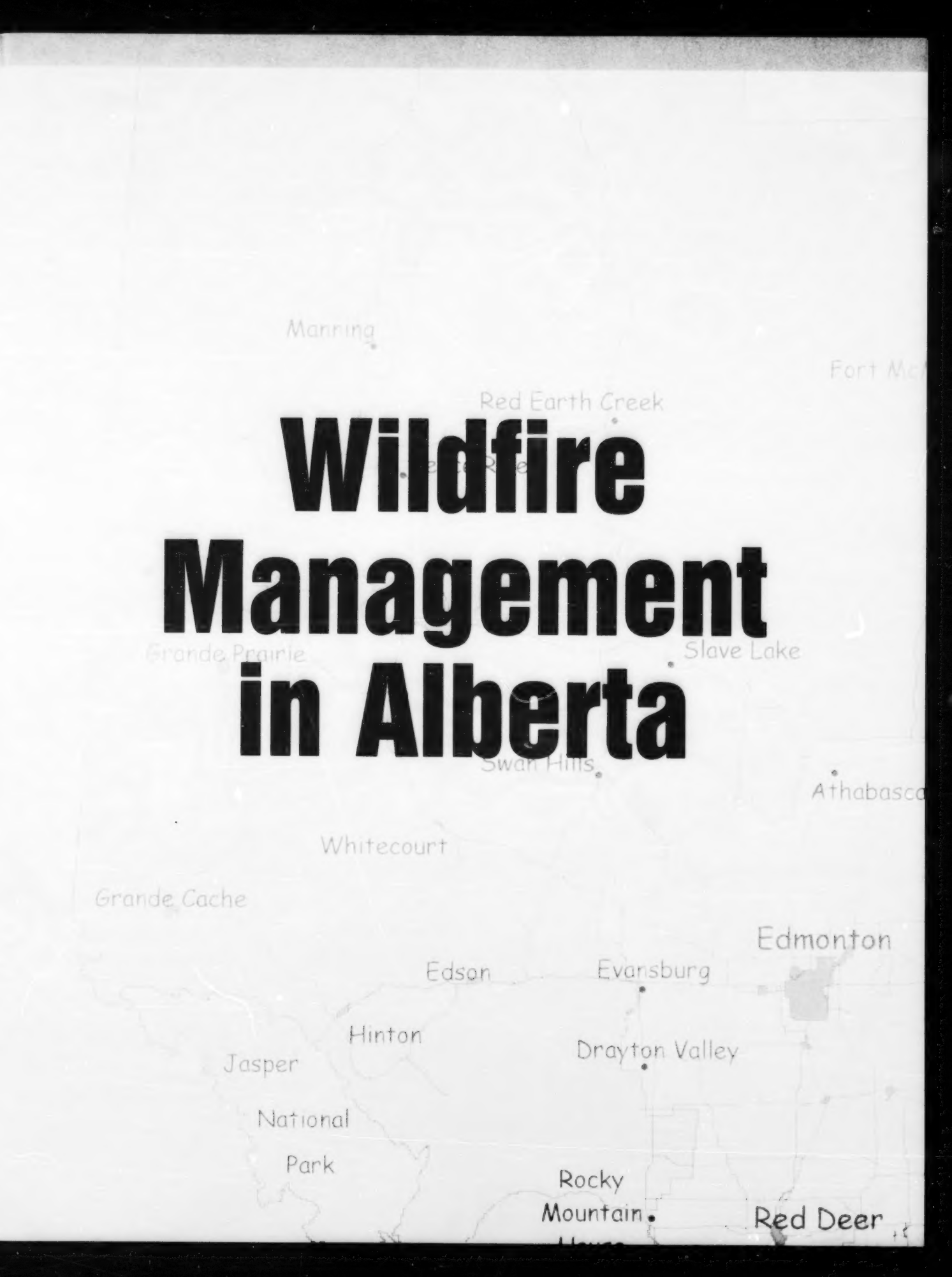


Wildfire Management

Alberta
SUSTAINABLE RESOURCE
DEVELOPMENT



Wildfire Management in Alberta

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Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

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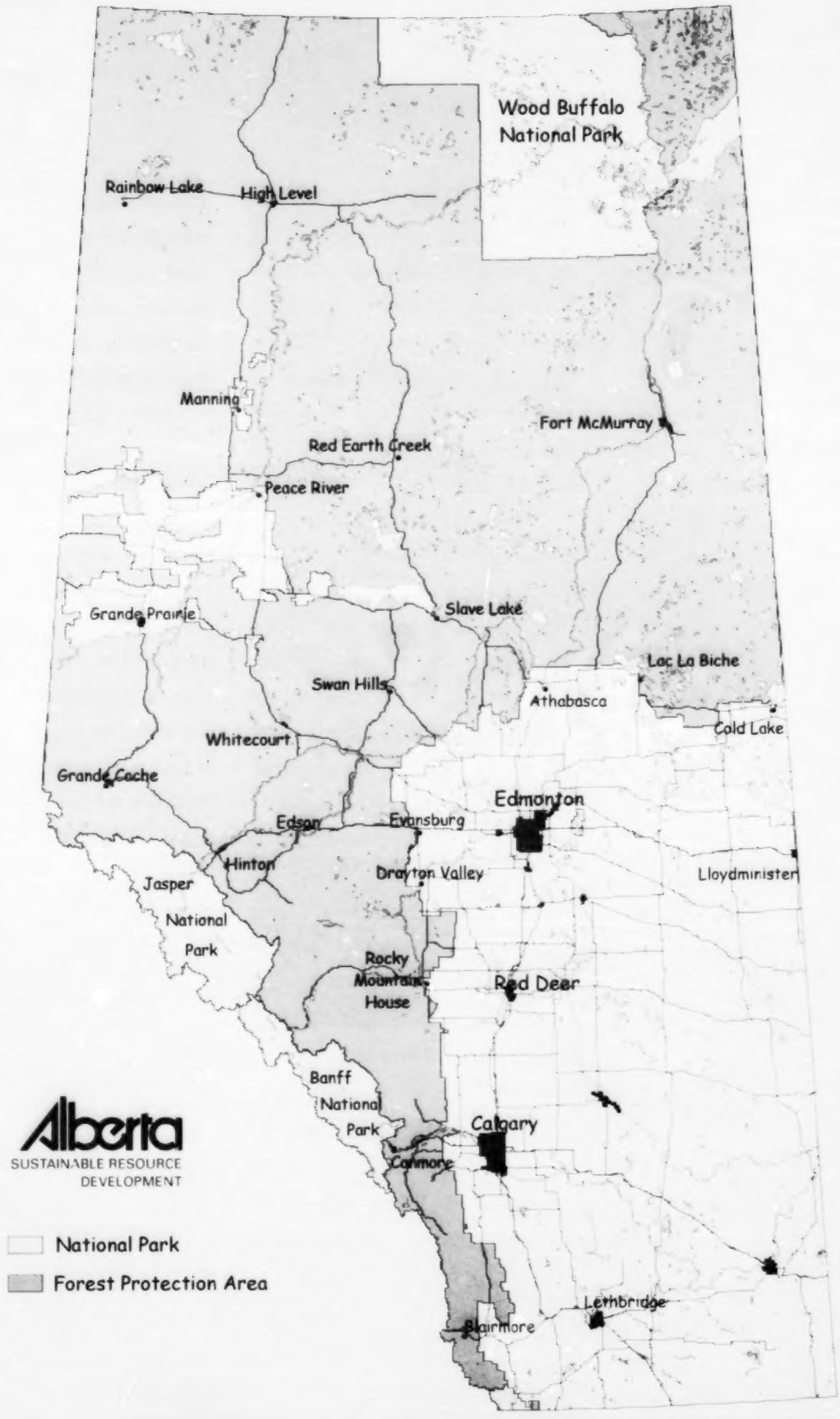
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SUSTAINABLE RESOURCE
DEVELOPMENT
National Park
Forest Protection Area

Fire in the Forest

Wildfire has shaped our forests for millennia

About 60 per cent of Alberta is covered in forest – a rich diversity of habitat, recreation opportunities and commercial resources treasured by citizens and visitors alike.

Almost all of this forest grows within what is designated as the Forest Protection Area, a vast area of land owned for the most part by the provincial government on behalf of the people of Alberta. Social, cultural, recreational and economic activities are allowed on a carefully managed and regulated basis so the benefits we enjoy today are sustained for future generations.

In the year 2000, Alberta's forest industry was listed as the third most important contributor to the provincial economy, after energy and agriculture. Industry revenues top $8.4 billion a year, and direct employment totals more than 25,000 people.

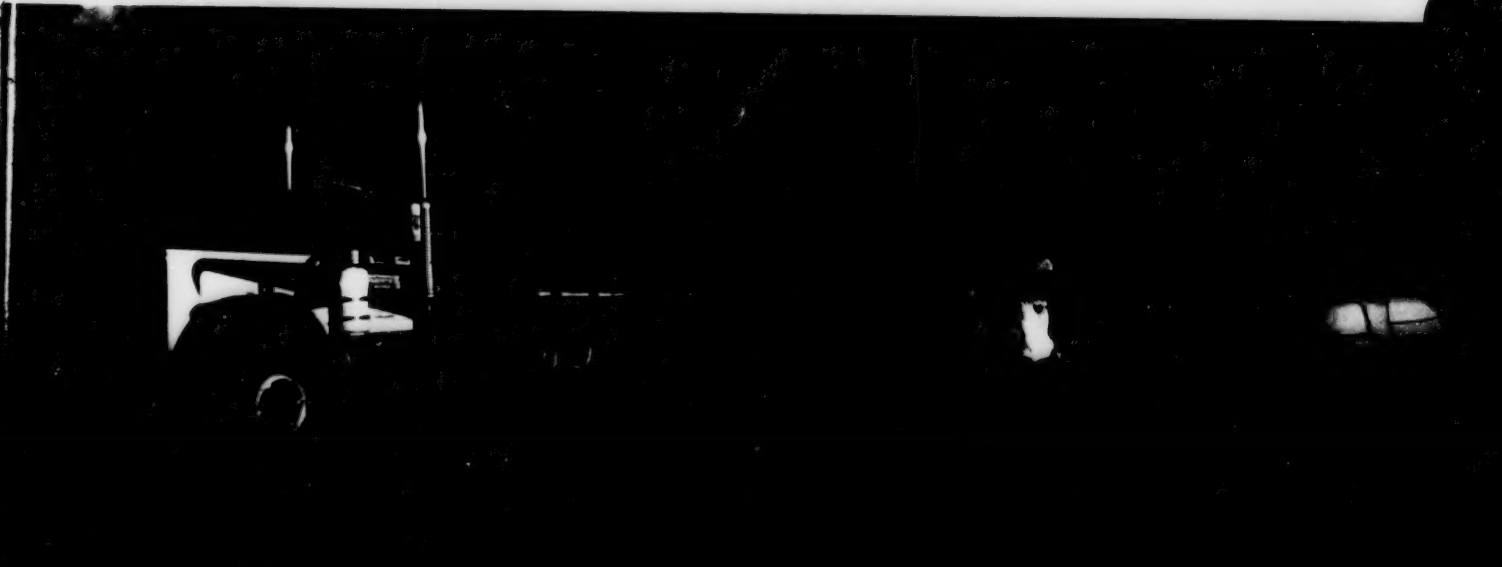
And it's a growing forest in every sense of the word. Timber harvesting is only allowed in about a quarter of the forest area. Principles of sustainable forest management mean harvesting never takes more than the forest can generate, and if forest fires reduce that productive capacity, harvesting rates are reduced accordingly.

One result of the surge of social and industrial interest in the forest has been a tremendous increase in research into a multitude of ecological, economic and social issues dealing with sustainable forest management. We've proven something that pioneers and First Nations have always known: Alberta forests are prone to fire, and indeed much of what we see in the forest today has been shaped by either fire or its absence. Some fires were set deliberately in the early days to maintain moose and bison habitat; many more were started by summer lightning strikes that led to huge tides of destruction and renewal. Before fire suppression efforts began about 60 years ago, only a small percentage of the forest was older than 75 years because wildfire was such a common and widespread occurrence.

Today's forest fire managers face an interesting challenge: How do we manage wildfire while recognizing there are both positive and negative impacts? And how do we do this while maintaining social and economic values? The task falls primarily to forest protection staff within the Land and Forest Service of Sustainable Resource Development. Working at the Provincial Forest Fire Centre (PFFC) in Edmonton, and throughout the province's 10 Fire Management Districts, they educate forest users, detect and suppress fires, and investigate ways to reduce the frequency and extent of wildfires throughout the forest.

How do they manage this enormous task? How do they leave room for some of the ecological benefits a forest fire can bring?

Read on to find out – but first, we'll provide some history around how and why Alberta became a world-leader in forest fire management.



A long history of wildfire suppression

From humble beginnings to international renown

Fire is an old companion of Alberta forests, shaping and renewing stands on a continual and widespread basis ever since the last ice sheets retreated to the north.

Fire detection and control became imperative, however, as early settlers moved in to make a living from the land in the 1800s, and as economic prosperity and industrial activity gained momentum in the mid-1900s.

Today's proud heritage of an internationally-respected fire management service came from humble beginnings, with two rangers appointed to monitor the entire province in 1883. By 1887, all men in each district were obliged to help fight fires, on pain of fines of up to $100. They traveled on foot, or by horse if they were lucky, and their tools were a barrel of water and some wet sacks they used to beat out the blaze.

The modern era of forest fire management dates back to the formation, in 1953, of a provincial government branch mandated specifically with fire control. Progress was quickly made on the keys to successful forest fire management: well-trained personnel, sufficient firefighting equipment, adequate transportation and access roads and effective detection systems.

Starting in the 1960s, fire control training was extended to people outside Alberta's Forest Service, and great potential was discovered in the training of First Nations and Metis residents living within the Forest Protection Area. At around the same time, programs of conservation work and education for young people were established through the Junior Forest Wardens and Junior Forest Rangers programs, increasing the number of Albertans with an understanding of the skills involved in detecting and controlling forest fire.

Despite all the advances, wildfire has not been driven from Alberta's massive Forest Protection Area. In fact, severely dry conditions in 1998 and 1999 led to more than 3,000 wildfires and the burning of 849,000 hectares of forest.

Losses would be much higher, however, without Forest Protection staff who continue to build on the dedicated legacy of their predecessors. They take advantage of continual training, the latest research and technology, and state-of-the-art information and management systems.

Above all, they uphold a code of professionalism that honours the uniform and an obligation to the public, providing Albertans with assurance of a demanding job well done.

Today's Forest Protection Division employs hundreds of men and women, between the Provincial Forest Fire Centre, or command centre, in Edmonton, and numerous Land Management Areas and

Fire Management Districts across the province. These staff have access to 270 Type I firefighters in helicopter-borne rapid-response crews and support units, and over 2,000 people designated as Type II or III wildland firefighters.

They lease airtankers, patrol aircraft, helicopters, dozers, crawlers, low-boys, catering camps – everything required to get to a wildfire fast and stay with it until it's out. Cooperative agreements with neighbouring provinces and states allow Alberta to bring in even more firefighters and equipment.

Today's wildfire managers push the leading edge of information technology, using everything from satellites to infrared surveillance to province-wide computer networks to find out where the fire is and predict where it's going. But the success of the service continues to rely on the people who make up Alberta's fire suppression force.

THE EVOLUTION OF PRIDE IN SERVICE

From the book History of Forest and Prairie Fire Control Policy in Alberta, Dr. Peter J. Murphy, published by Alberta Environment, 1985:

1832: Penalties for human-caused fires first instituted by the Council of Assiniboia.

1877: The council of the North West Territories, of which today's Alberta was a part, passed an ordinance for the prevention of forest and prairie fires at its first session.

1876: Federal Department of the Interior formed, leading to the establishment of a Crown timber agent in Edmonton in 1882 along with two forest rangers, located in Edmonton and Calgary.

1919: A disastrous fire year highlights the need for detection, faster communication, especially phone line construction, and quicker access to fire areas.

1920: The use of aircraft for fire patrol begins.

1921: First lookout cabin built; also, the first formal fire control plan developed for Alberta's forest regions, and the first seasonal ranger school held.

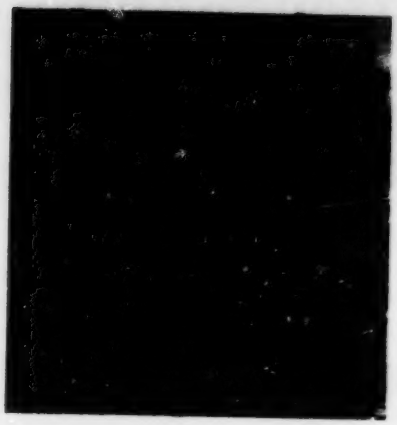
1930: The Transfer of Resources Act passed responsibility for natural resources, including forest protection, to the provinces.

1938: First forestry radios obtained.

1946: Alberta Post-War Reconstruction Committee recommends forest inventories, expansion of fire prevention services, reforestation, training for staff and more tree nurseries.

1948: Green Zone established to distinguish between forested land and lands (White Zone) capable of supporting agriculture.

1950: Forest Service staff given uniforms; first formal ranger course held at Banff.



1952: Policy of fighting only those fires within 10 miles of roads and major rivers discontinued.

1953: Forest Protection Branch established specifically for fire control.

1955: First Junior Forest Wardens club formed at Hinton to teach youngsters about forests and fire.

1957: First Forest Service aircraft for use in fire obtained.

1960: New fire training centre created at Hinton.

1976: Fire control policy stipulates the average annual area burned was not to exceed one-tenth of one per cent of the forest land area.

1980: Objectives established: fire discovery size of ¼ acre of less; reporting time five minutes or less; control size three acres or less; get-away time for initial attack 15 minutes or less; action on all fires within one hour or less.

2000: Staff complement of 760, within Land and Forest Service, annual base budget of $38 million, 200 weather stations, 2,350 contract firefighters available.

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Prevention - the first line of defence

Three strategies to get the message out

Prevention is the cornerstone of Alberta's wildfire management system, simply because it's easier and cheaper to prevent a wildfire from starting than to put it out.

And it seems users of our forests are responsive to the idea, judging by the fact that an average 40 per cent of today's wildfires are human-caused, down from 50 per cent a decade ago.

The Forest Protection Division of Sustainable Resource Development has developed a sophisticated three-pronged approach to fire prevention: education, engineering and enforcement.

Provincial Forest Fire Centre staff in Edmonton and staff in the Fire Management Districts around the province are all involved to varying degrees in educating recreational and industrial users of the forest about fire prevention.

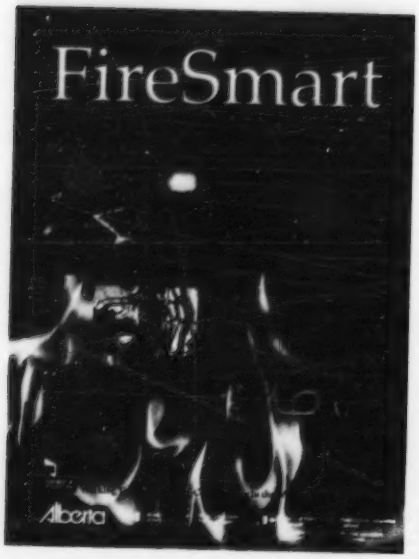
An advertising blitz each spring reminds campers and travelers to ensure fires are carefully watched and extinguished. Landowners are given details of how and when to apply for burning permits. Colourful posters and brochures are made available to clubs, schools and campsites to reinforce the rules of safe fire use. Bertie Beaver, the Division's mascot, is a popular guest at events and presentations around the province.

Special attention is paid to Alberta's schoolchildren – the forest users of tomorrow. The forest protection message is included with learning tools made available to children in the elementary grades, and in forestry modules that are taught in many junior and senior high schools.

Alberta is also unique in Canada for its provincial support of the Junior Forest Wardens and Junior Forest Rangers programs – which celebrated their 40th anniversary in 2000. The programs teach young people and their parents how to understand, appreciate and enjoy the forest, including how to keep it safe from fire. Many people working for Sustainable Resource Development today got their start by participating in these programs as youngsters.

There are also continuing programs and services to educate and assist industry in fire-smart operations. Railways, energy companies and forest managers call on Forest Protection Division staff for information and advice on preventing wildfires that could endanger their operations and their workers.

Sustainable Resource Development and Land and Forest Service are also at the forefront of the rapidly-emerging science of wildfire prevention through engineering, or the modification of



practices and sites to reduce the likelihood of fire.

Moves to protect communities and subdivisions in and around the forest are of key importance as Alberta's population grows. Alberta is a lead player in the Partners in Protection coalition, a national/provincial/municipal association that in 1999 published a manual giving homeowners and municipalities detailed advice on how to reduce the risk of loss and enhance safety in the wildland-urban interface. Types of siding and roofing materials, proximity of trees, availability of water and more are discussed in the easy-to-read *FireSmart* book available at forest area offices.

Engineering practices can also be modified to improve the fire safety of sites managed by the oil and gas sector and utility-line companies. These organizations clear a lot of bush and forest each year, and matters such as location of sites and disposal of woody material can always be managed to cut down on the danger of wildfire. Sustainable Resource Development offers training and educational services to these industries to help develop planning and operational strategies.

Alberta forest companies are now drawing on a growing body of research that offers proven strategies for reducing the likelihood of fire in forest stands of all ages. Planning of future harvest and regeneration sites can create "fire compartments" within the forest that greatly reduce the risk of fire spreading out of control.

Another engineering strategy utilizes "prescribed burns," which are controlled fires that remove hazards such as dead grass and branches that build up as a result of fire suppression activities. Prescribed burns are discussed in more detail on page 18.

Sustainable Resource Development's third tool in fire prevention is enforcement. Fines may be levied for illegal burning, and offenders might also now be presented with a bill for the cost of fighting a wildfire that gets out of control. It can be a sizable bill, with the cost of an airtanker at $12,000 for each fly-past and helicopters at $1,250 an hour, not to mention the groundcrew's payroll.

Training readies firefighters for action

Certification system sets high standards

Alberta has set an objective of attacking all wildfires before they reach two hectares in size, which requires a force of highly trained firefighters ready to be deployed within a matter of minutes during the fire season.

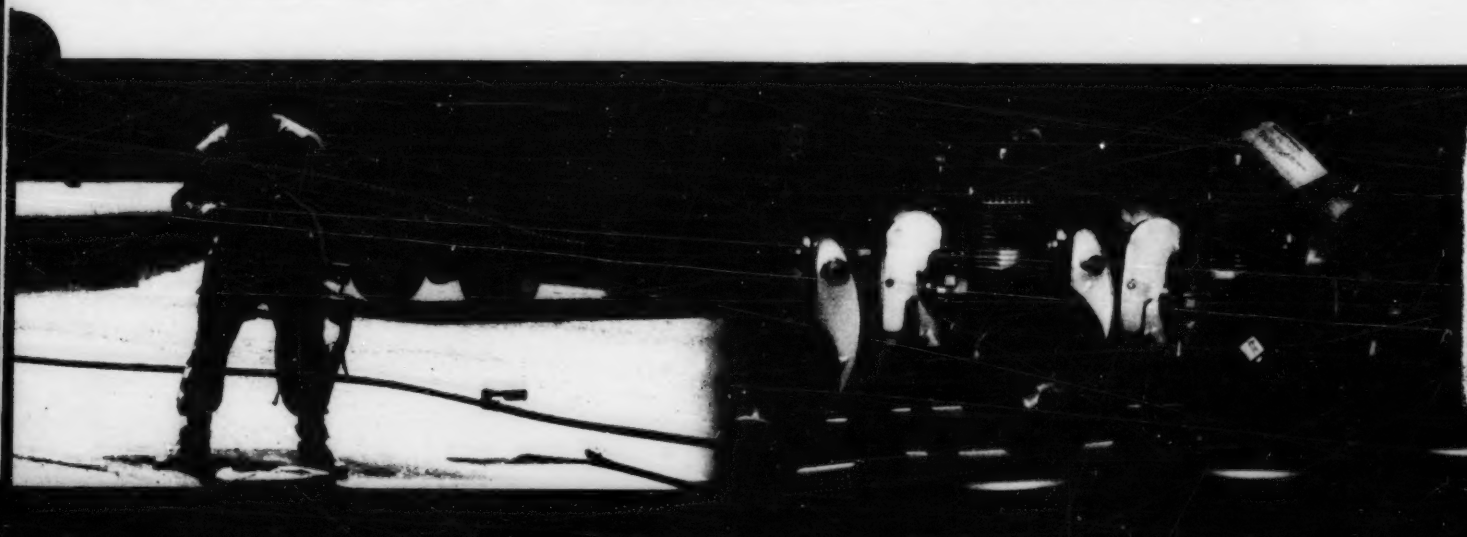
College and university students, First Nations and Metis people, private contractors and forest industry employees make up the many units called into action at various times and places throughout the fire season. All come under a system of certification that ensures the forest has the best protection possible and the personal safety of the firefighters is held to the highest standards.

At the hub of the training system is the Environmental Training Centre in Hinton, where some of North America's top instructors are brought in to help teach fire courses. Students are given access to interactive learning systems, a fire management simulator, a rappel training tower, and physical fitness training to test their limits of endurance. Some of the classroom courses are also delivered through satellite colleges across the province to train community-based units of firefighters. Candidates are trained and certified to meet the requirements of one of the several types of firefighting unit; many of them, especially those who go on to full-time careers with Sustainable Resource Development, take additional courses over time in order to take up more senior duties within the fire management system. Many more move on to other careers, which makes for a constant flow of new recruits through the training system each year. The website www.gov.ab.ca/env/resedu/etc/wfm2.html provides additional information about the course.

Alberta trains five classifications of firefighter: Wildland Firefighter Type I, I-R, I-HS, II and III. All firefighters must pass rigorous physical fitness tests prior to the start of the fire season.

Training of Type I-R (rapattack) and I-HS (Helicopter Support) firefighters includes a 10-day course in map reading, fire behaviour, firefighting methods, weather, radio, helicopter safety, pump and power saw operation, work hazard materials and bear safety. It's an intensive course, with 6 a.m. fitness training, evening lectures and exams. Candidates aiming for a spot on one of the Type I-R rapattack units must also undergo rigorous training on the rappel tower and in helicopters.

Type II firefighters are trained for sustained-action: they are the contract professionals who work on the ground to fight a large fire that is spreading and requires the efforts of many units. They must meet strenuous physical fitness

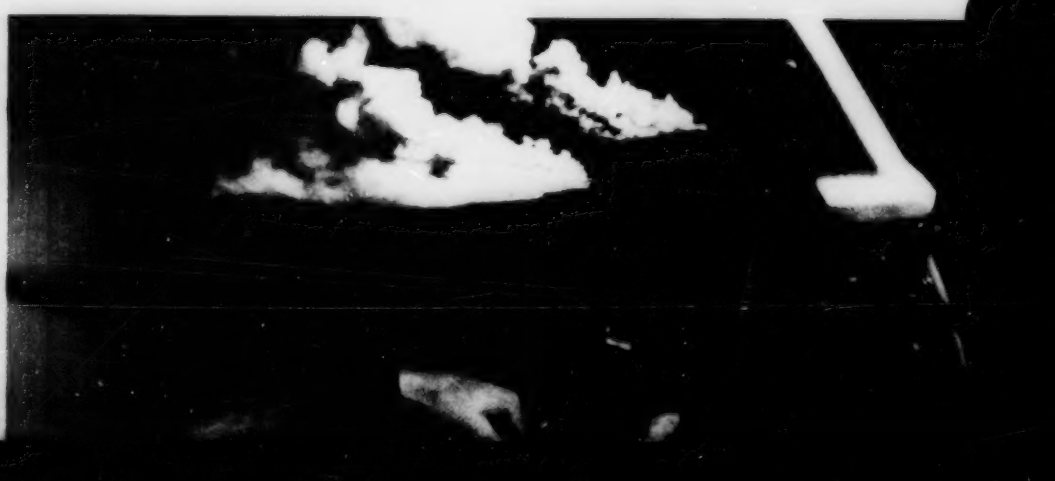


standards prior to attending a 16-day training course. Trainees become familiar with all aspects of firefighting, before taking on seasonal contracts at bases around the province. They're ready at all times to carry out flanking action and mop-up operations on wildfires.

Type III firefighters take a six-day course covering forest fire behaviour and control, radio, equipment use, map reading, and bear awareness. Successful candidates are certified and hired on with units that work up to 24 days at a time. Like the Type I and II firefighters, they have to be ready to go anywhere, any time.

Many find the rigorous training helps them find full-time work in other fields, so new recuits are welcomed each year to maintain the province's complement of about 3,000 certified firefighters.

In a heavy fire year, the province can also call on reciprocal agreements with other provinces and the United States to import firefighters – such as in 1998, when 900 out-of-province firefighters served here. In 2000, more than 200 of Alberta's firefighters traveled south to help tackle wildfires in Montana.



The role of industry

Partners in wildfire prevention and suppression

The forest products industry is a key player in Alberta's forests, and has a large stake in the success of fire management.

In addition to paying fees for the rights to harvest timber, the industry pays the provincial government holding and protection charges totalling about $6 million a year that go, in part, to help finance the cost of fire management.

The industry also plays an active role in firefighting, supplying personnel and equipment as needed to work alongside regular government and contract units, and providing valuable input to fire management teams.

Forest companies have many staff and contractors out in the field every day, creating a monitoring network able to see and report fires as soon as they break out. Loggers in the fall and spring, and tree planters in the summer, are given an orientation so they know exactly what to do when they detect a wildfire. Some companies certify members of their staff to form firefighting units as the need arises. Other staff hone firefighting supervisory skills at the Environmental Training Centre in Hinton. Most companies also have equipment such as pumps, water tanks, hoses and dozers that can be called up to the fire line as required.

Given the value of commercial timber stands, companies are naturally anxious to know as much as they can about a wildfire as it progresses, and even provide some input as to suppression priorities. Sustainable Resource Development has met these needs with industry liaison officers who live and work in forest areas and provide daily - sometimes hourly - updates on fire developments. When a specialized management team moves in to control activities around a major wildfire, industry representatives have an opportunity to sit at the table and provide input and advice.

Forest products companies are also now moving toward "FireSmart" forest management planning practices that reduce the threat of fire. Examples include innovative harvest layouts to create fire breaks, and silvicultural treatments such as debris disposal and stand thinning.

The forest industry, along with oil and gas interests, First Nations and Metis groups and municipal districts, are invited at least twice a year to attend meetings of the provincial Forest Protection Advisory Committee. The meetings allow the stakeholders to review the fire situation and its management before and after each season, and to make suggestions for improvement.

Weather

Meteorological data plays critical role

Lightning storms, drought, wind, low relative humidity - they're all meteorological factors that contribute to the fire weather picture each season.

Firefighters and their managers depend on accurate weather information, either to position themselves in the right place before a wildfire breaks out, or to make split-second decisions when there's an active campaign under way.

Sustainable Resource Development's Forest Protection Division has its own meteorological section, staffed by three weather specialists and a technician. They're among the best in the business, and their information is also used to compile national climate statistics.

The section uses weather information from the winter to provide a detailed assessment of hazard locations throughout the Forest Protection Area each spring. Initial fire hazard ratings are developed, based on precipitation recorded over the previous winter and the physical condition of potential "fuel" (grasses, leaves, twigs and logs) within the forest. Central and area managers then use this information to make preliminary plans based on where the fire hazard appears to be greatest.

Once the season begins, the meteorologists provide twice-daily updates in the Edmonton briefing room and via a communications network that links all the Fire Management Districts. The outlook is modified twice a day as current information comes in from 40 automated weather stations, 15 lightning sensors and 132 lookout towers, as well as Environment Canada's radar and satellite operations.

When a wildfire is burning, weather information is also used to calculate, through computer simulation software, just how the blaze can be expected to behave. The information is critical to fire bosses who must determine which section needs the most attention, whether the wildfire is likely to threaten life and communities, and what level of resources must be called upon. In a major fire situation, a meteorologist may travel to the site to provide immediate analysis and advice.

Fire Detection

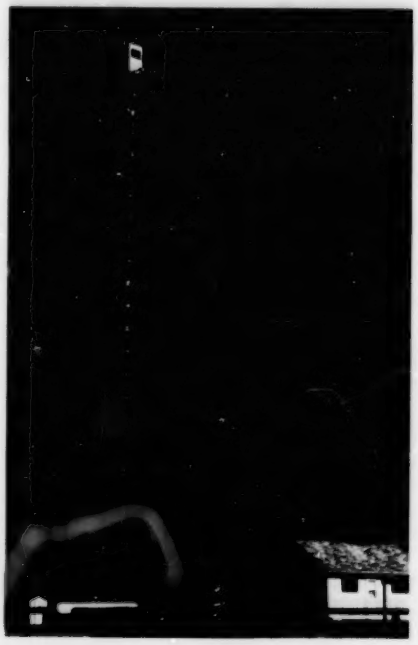
Lookout towers, aerial patrols keep constant watch

Sustainable Resource Development's goal is to detect all wildfires before they grow beyond 0.1 hectare in size.

The backbone of the detection system is a network of 132 lookout sites strategically placed throughout the 393 million square kilometres of the forest protection area. These consist of living quarters for the lookout person, and a tower if necessary to provide a view over a 40-km radius.

Men and women are hired to staff lookouts in the settlement areas beginning in April, while more remote lookouts are opened up in May and June as the fire and summer storm seasons begin. On cool, wet days lookout operators radio in their report twice a day, while in high-hazard situations they can be in a tower 37 metres above the ground for 14 or 16 hours a day.

Lookout life can be rugged, and

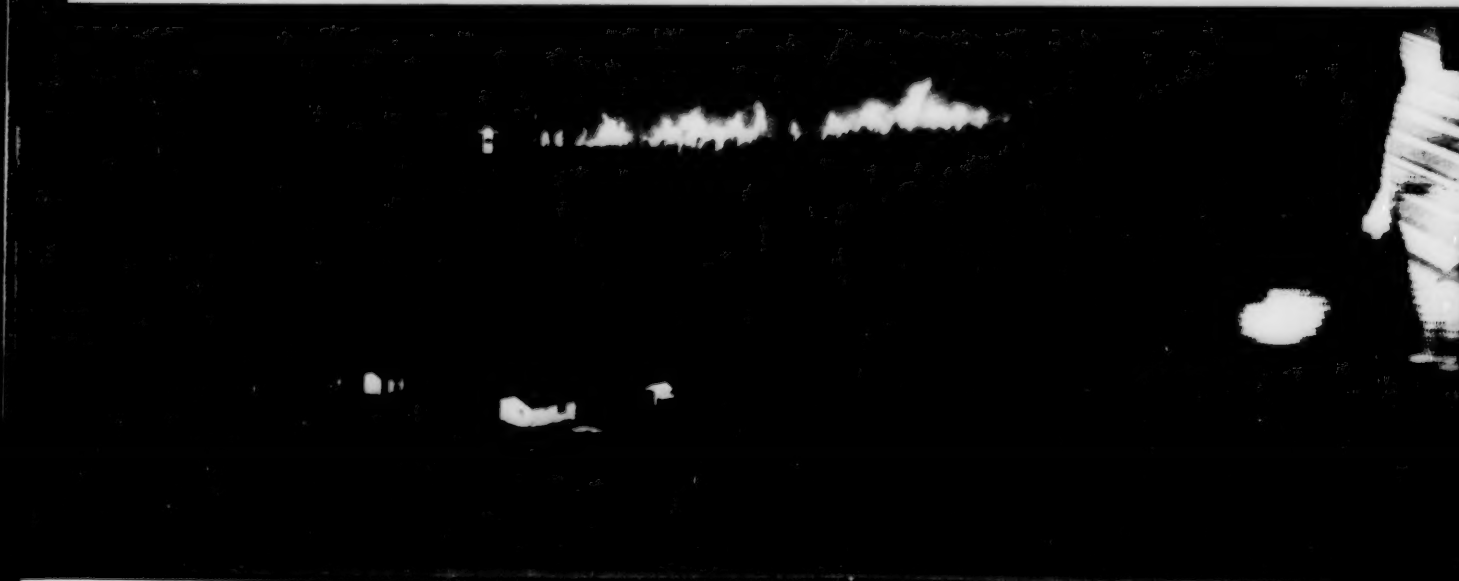


there are often wildlife hazards to contend with. However, it's a job many enjoy. They undertake it with pride and return for duty year after year. One person served at a lookout site for 50 consecutive seasons. More than 20 have been in the job for two decades or more.

Lookout personnel rely on keen eyesight and a constant awareness of the terrain features within their lookout visible area. Their equipment consists of binoculars, weather instruments, communication equipment and a firefinder that calculates the location of a wildfire. Radios are used to transmit information to area offices, where it is entered into the computer system and relayed to the Provincial Forest Fire Centre in Edmonton.

Complementing the lookout stations are fixed-wing and helicopter patrols. Members of the public are asked to call (780) 427-FIRE collect any time they see uncontrolled fire or smoke where it shouldn't be.

Alberta's system of lookouts - one of the most extensive on the continent - is still, however, the most effective and affordable insurance against wildfire in the province.



Fire-ready and on high alert

Resources strategically positioned before wildfire breaks out

Sophisticated weather information and the calculation of fire hazard ratings give managers a strong indication of where the worst fires are likely to occur and how they'll behave.

The information generated by the Spatial Fire Management System modeling software is used to display where the highest fire hazard is likely to be. A high head-fire intensity, coupled with information about values at risk, triggers a decision about where to strategically position resources before the wildfires start.

The strategy is called Presuppression Preparedness Planning. It's impossible to outwit Mother Nature all the time, but in the average year, this planning has been shown to reduce the area burned dramatically.

Area managers and the coordinators in Edmonton aim to ensure each wildfire is actioned before it reaches a size of two hectares, and contained by 10 a.m. the next day.

To achieve this, they deploy their resources where the need is predicted to be greatest. Available resources include 44 wildland firefighting units, patrol aircraft, airtankers, rapid-response helicopter units, ground equipment, tent camps, cookshacks and more.

Drought and extended periods of hot, windy weather still cause busy fire years, of course, and Sustainable Resource Development uses these challenging conditions to find new ways to be even more effective.

The push for continual improvement leads to periodic review, and incorporation of changes such as enhanced training programs and innovative firefighting approaches.

Initial Attack

Rapid response stops many wildfires in their tracks

Rapid response on the outbreak of wildfire is provided by resources that are, by chance or design, located in the area, supported by helicopter-borne units that can be called in at a moment's notice.

Alberta has 10 seven-person units of rapattack (Type I-R) firefighters. These units have full firefighting and safety training, as well as the ability to rappel down from a hovering helicopter to attack a fire in any location. The helicopters carry water or a water/foam combination in their buckets allowing them to play an active role in suppression while the units are on the ground. They're invaluable for ferrying in equipment or emergency retrieval of firefighters. Also attached to this program are four eight-person Helitack Support units trained to support Type I-R and Type I units.

Complementing the rapattack units are 30 three or four-person helitack (Type I) units, which also concentrate on initial suppression of wildfires. They make up another highly-trained suppression force and are highly mobile.

It's hard, dirty and hazardous work for all the units, involving the rapid hauling of pumps and hoses over terrain that can be steep and choked with undergrowth. There's been no shortage, however, of college and university students eager to take up the challenge of leadership, physical achievement and adventure.

The units are stationed around 18 primary, 38 secondary and 127 day bases within the Forest Protection Area. They can also make use of 14 airtanker bases, and on many occasions will simply be dispatched to a clearing in the forest to keep an eye on the situation.

Personnel in birddog aircraft help

spot the position and progress of new wildfires, sometimes using infra-red sensing technology to "see" through the smoke. The birddog aircraft also lead airtankers into position over the fire.

Two Convair 580 aircraft, new for 2000, can move in at 575 km/hr carrying almost 8,000 litres of fire retardant. Other aircraft owned or leased by the province include: one DC-6, 10 A-26s, three Air Tractor 802s and six CL-215s.

Campaign Fires

Vast arsenal of resources called into play

Sometimes the objective of controlling a wildfire before it surpasses two hectares can not be achieved, due to combinations of severe weather, topography and forest fuels.

When these wildfires race out of control they can grow into campaign fires. These wildfires draw on the full might of Alberta's resources, and sometimes of other provinces and states as well.

The Mutual Aid Resources Sharing agreement allows for the sharing of personnel and equipment across Canada; the Northwest Wildfire Compact of 1998 allows for similar exchanges between western Canada and states in the northwestern U.S.

Professional firefighters in the Type II units as well as seasonal contract firefighters in Type III units are massed on the fire line to slow the wildfire's spread through suppression activities and creation of fire breaks and barriers.

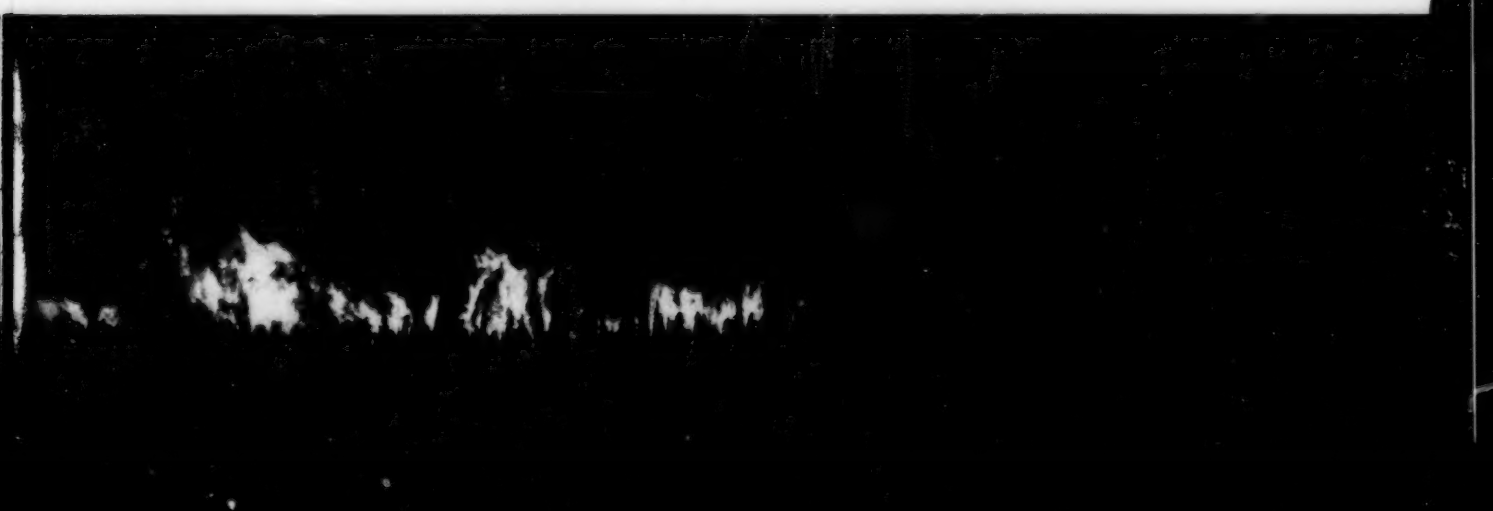
If the wildfire is some distance from one of Alberta's 18 permanent and 38 secondary bases, tent or trailer camps are set up. Lowboy rigs carrying bulldozers and crawlers are brought in to clear ground for fire breaks. Industries operating in the area contribute information and resources, and all the while utmost attention is paid to the safety of firefighters, nearby residents, and anyone in the forest.

Briefings at the Provincial Forest Fire Centre move into high gear, coordinating and passing a constant flow of information to the wildfire site.

As more personnel become involved, government staff step in to head up the overhead team, an on-site management unit made up chiefly of four people. The Fire Boss calls the shots for managing the fire; a Line Boss controls forces on the fire line and in the air; a Plans Chief devises the plan of attack for the coming day, and a Service Chief takes care of all the logistics.

All of them have extensive experience in forest firefighting. Their careers have also put them through many simulations and debriefings at the fire management simulator in Hinton. Their decisions safeguard timber resources and industrial operations worth millions of dollars - and most important, the lives of Albertans who live in and around the forest.

Alberta has about 3,000 certified firefighters available for duty, including many Land and Forest Service staff. In a busy fire season, it's not uncommon to find staff have been called away from their offices to help with communications and other duties at a fire site.



Prescribed Burns

Recognizing the important ecological role of fire

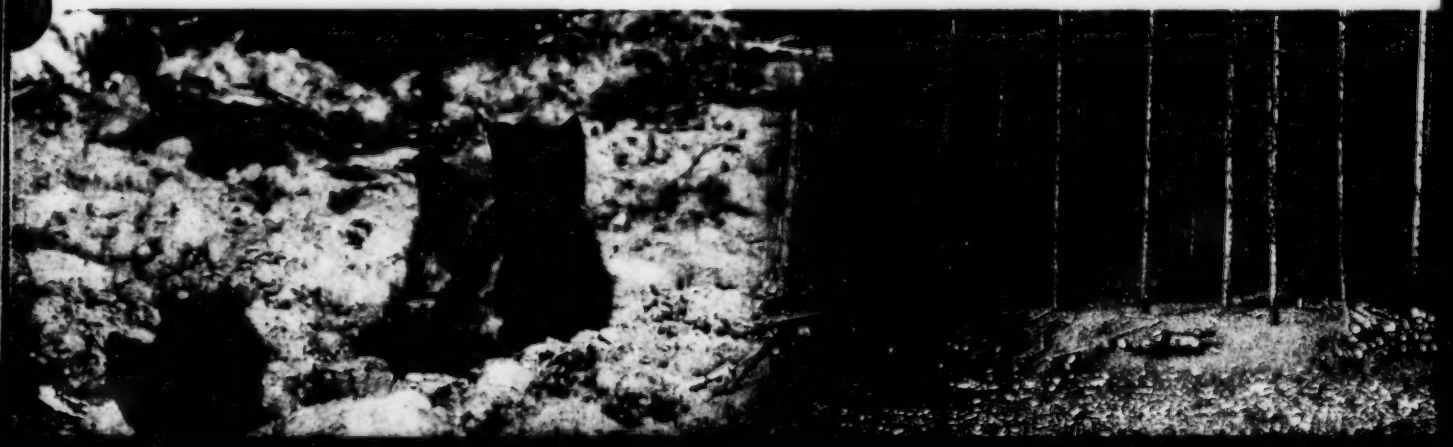
Forest managers periodically decide that a controlled fire must be planned and started. This achieves certain safety, silvicultural, wildlife or other resource management objectives.

Fire played a major role in shaping Alberta forests for 10,000 years until just a few decades ago. That's when efforts began in earnest to mitigate the negative effects of fire - and they have been so successful that many hectares of the forest are now much older than they would have been without human intervention. Older conifer stands are denser and more flammable, and also a much different habitat from what native wildlife would otherwise have enjoyed. If suppression strategies continue their 60-year record of reducing the amount of fire, the probability of larger, more catastrophic wildfires in the future is greatly increased. Sometimes a prescribed burn is the only way to reduce the hazard level and allow fire back into the ecosystem.

Other reasons for prescribed burns include enhancing wildlife habitat, controlling disease and pests, managing fuels and converting fuel types, as well as enhancing silvicultural operations. Managers plan fire not to eradicate problems, but to restore a level of natural diversity so that forest ecosystems remain in balance.

After plans are carefully reviewed, the fire is started when weather conditions are right and all firefighting needs and personnel are readily available to the site.

Alberta has lengthy experience in successful prescribed burns, coupled with strong data on forest fuel conditions and fire behaviour. Sustainable Resource Development staff use this expertise to keep the forest healthy.



Warehousing

Ensuring firefighters have what they need, when they need it

Thousands of firefighters and dozens of support bases and camps require huge amounts of supplies once the fire season begins.

The Forest Protection Warehouse and Service Centre in Edmonton holds the responsibility for making sure units in the field have what they need, when they need it. A labyrinth of warehouse shelves holds boxed kits that contain anything from gas-powered pumps and accessories to field rations to axes and shovels.

They're guaranteed to be delivered anywhere within the province in 24 hours, and a 12-hour target is more often the norm.

In addition to the Edmonton warehouse, supplies are stored around the province in 400 locations, from lookout towers to regional stores, and it's the job of central warehouse staff to know exactly where everything is.

A new computer system provides sophisticated inventory control, and maintenance schedules ensure field equipment is always brought in regularly to keep it in tip-top order. Anything used in a fire is automatically returned for sharpening, patching, tune-ups and cleaning.

Purchasing new supplies is another important function of the central warehouse, with spending totalling anywhere between $12 million in a severe fire year such as 1998 and $3 million in a more "normal" season.

A sample of items in the provincial inventory:

- Hoses - 2.4 million feet, or 744 km (and another two million feet to be added by 2002);
- 12 kinds of fire pump - 995 units;
- Two-cycle oil for pumps/chainsaws - 24,000 bottles;
- Shovels - 2,472;
- Axes - 1,972;
- First Aid kits (three sizes) 6,897;
- 16 types and sizes of tent - 3,684;
- Ration packets - 133,182.

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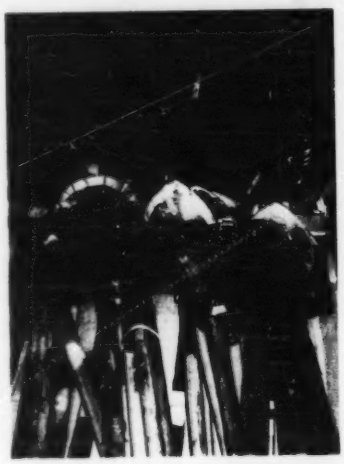

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Fire Science & Technology

Sophisticated systems provide valuable intelligence

Alberta is a leader in the development and application of technology that gives firefighters the upper hand in the battle against wildfire.

Science and technology provides the kind of "intelligence" that helps managers make judgments about where to position resources before wildfire breaks out, about how a wildfire will behave, and about how best to halt its advance.

Predictive computer models and tools, advanced communications systems and real-time mapping of resource positioning put powerful information in the hands of decision-makers on a minute-by-minute basis.

Specialists at the Forest Protection Division have either played a key role in developing these tools, or have made refinements and modifications to products proven at the national and international level.

Computer models and systems are an enormous help because they can process and assess complex streams of data to provide important fire intelligence. They answer questions such as:

- What is the best resource mix to put in position considering the predicted fire behaviour for the coming day?
- Where are the hotspots?
- How far will the fire spread in the next 24 hours?

These models and tools, of course, depend on current and reliable data for the Forest Protection Area and adjacent cooperative zones. The Fire Science and Technology Section within the division gathers and manages huge amounts of information on forest fuel status, weather and topography. The digital information is managed within a Geographic Information System (GIS) that instantly links data with mapping programs so an accurate visual picture of the situation can be shared by computer with managers in any location. Understanding each day's fire environment and potential fire behaviour is essential to managing the threat of wildfire. One of the key building blocks of each day's planning is information produced by the Spatial Fire Management System. The system processes current weather, fuels and topographical information, starts a theoretical fire in high-hazard locations across the protection zone, and then provides an assessment of how each fire would progress. This information gives managers a strong idea of where the highest fire hazards are likely to be.

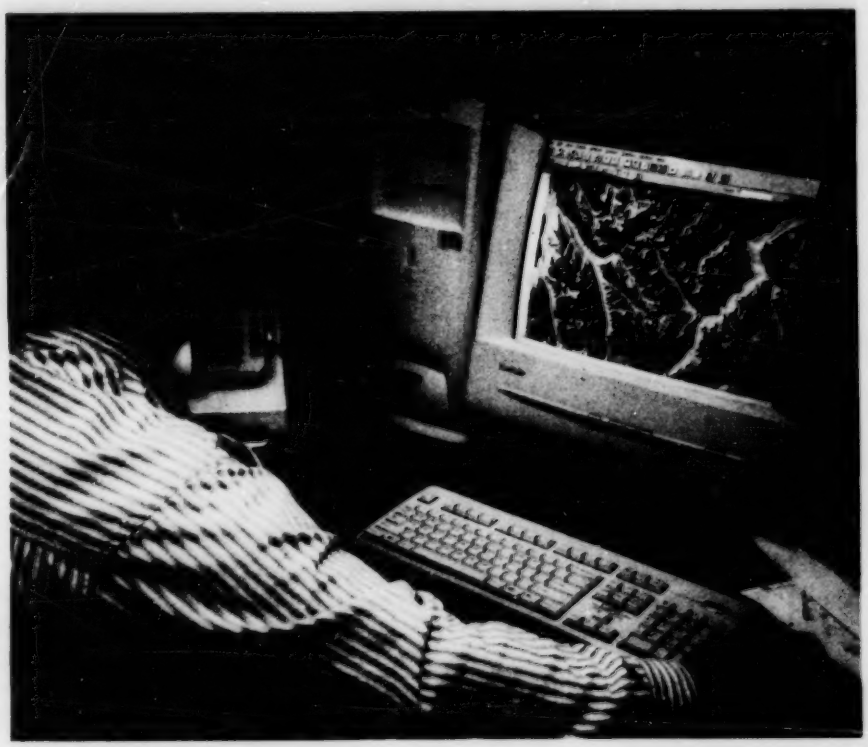
Other programs add more information to help the decision-makers. The Crowning Susceptibility Model indicates where crown fires are most likely to occur; the Airborne Wildfire Intelligence System gathers and manipulates fire information; the Canadian Wildland Fire Growth Model bolsters predictions as to how a fire will behave.

Technology is put to many more uses within the division. A new program creates maps showing exactly which parts of the terrain are visible from each lookout tower, warning planners of blind areas that might need additional coverage by aircraft.

Another program creates 3-D maps of Alberta's terrain, for use by low-flying airtanker or birddog pilots who need detailed and accurate information about the peaks and valleys below them.

A new initiative revolves around the move to integrated resource management and the need to better understand the ecological role of fire, as well as its potential threat to resources and values on the landscape. The Fire Science and Technology Section is developing tools, models and an implementation framework to design and manage Alberta's forests around the positive and negative impacts of fire.

In other parts of the division, initiatives such as the computerized tracking of the thousands of supply items used by firefighters and an Internet tracking system for aircraft leasing have all helped bring Alberta's wildland firefighting firmly into the 21st century.



Forests for the future

Wildfire management promotes all aspects of sustainability

Wildfire is a fact of life in Alberta's massive forest area, and for millennia has been the major force in shaping the wild beauty we benefit from today.

Albertans want a sustainable forest, now and for the future, for the sake of social, economic and ecological security and preservation of a treasured way of life.

Forest and fire management, therefore, play a pivotal role in the development and future of the province, whether through prescribed burns that enhance ecological diversity or through rapid suppression of dangerous and damaging wildfire.

Albertans can be sure that fire management policies are built on some of the best experience, research and science in the world. Firefighters and managers benefit from the most innovative and intense training programs found anywhere. At their disposal they have the financial and mechanical resources required to get the job done.

Education programs have cut the number of human-caused fires significantly. Pre-positioning resources before fire begins has reduced the extent of damage dramatically.

It's not over yet, however, and never will be. Sustainable Resource Development's forest protection program will continue to seek new, better, more effective ways to manage wildfire for the benefit of all who value our forests.

how to reach us

The Provincial Forest Fire Centre can be reached in Edmonton at:
(780) 427-6807
Please also check our web site location:
http://envweb.env.gov.ab.ca/env/forests/fpd

We value your feedback. Let us know how well this publication has met your information needs, and whether there are other fire-related topics you'd like to see us cover in future editions.
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Glossary

Aerial Igniters/Heli-Torch
Airborne equipment and material used to ignite deliberate fires from aircraft.

Airtanker
Fixed-wing aircraft equipped to carry and drop water and/or chemical fire suppressants or retardants on a wildfire. Some helicopters are also equipped with smaller water/retardant tanks.

Birddog Aircraft
An aircraft used to direct and lead airtankers into position over a wildfire.

Birddog Officer
A Sustainable Resource Development officer who supervises and directs the overherad operations of airtankers at the scene of a wildfire.

Campaign Fire
A large wildfire which has escaped initial attack, requiring the commitment of significant suppression resources over a prolonged period.

Crown Fire
An extremely intense wildfire that has taken hold in the crowns (tops) of trees and can spread very quickly with the wind.

Fire Break
The removal of trees to create a buffer zone around a townsite or other area of human activity near the forest.

Fire Line
1) An area on the ground where firefighters are actively working to suppress a wildfire;
2) A strip of land that has been cleared of fuels to control a wildfire.

Fireguard
A physical barrier of earth constructed to halt or impede the spread of a wildfire.

Fixed Detection
A system of permanent, staffed lookout sites serving to monitor the forests for the outbreak of wildfire.

Forest fuel
Forest contents that could contribute to a wildfire event - grasses, leaves, twigs etc.

Forest Protection Area
The area of Alberta for which the Forest Protection Division has the mandate to manage, suppress and control wildfire.

Fuel Moisture Content
The amount of water present in forest fuels, calculated as a percentage of total weight. This is the most important factor in determining the fire danger in a forest.

Hazard Reduction Burning
The selective and controlled burning of dry grasses and other dangerous combustibles to prevent wildfire.

Holdover Fire
A subsurface or dormant fire which burns slowly and avoids detection for a prolonged period of time.

Hotspot
A small, hard-to-detect area of glowing combustion along the perimeter of a wildfire.

Infrared scanning
An optical-electronic system that detects thermal infrared radiation (heat) that is invisible to the human eye.

Initial Attack
Fast response to a wildfire report, in support of the provincial strategy of attacking any wildfire before it reaches two hectares in size.

Overhead Team
Group of senior personnel assembled to take charge of firefighting activity in a campaign wildfire situation.

Prescribed Fire
A controlled fire ignited for land use improvement (habitat, reforestation etc.).

Presuppression
The strategic movement and placement of firefighting personnel and equipment around the forest in advance and anticipation of wildfire outbreak. The practice facilitates early suppression and minimizes wildfire damage.

Provincial Forest Fire Centre
The Provincial Forest Fire Centre (PFFC) is the primary centre for coordinating Alberta's overall forest protection effort and for initiating province-wide policies and programs.

Rappel
A firefighter's controlled descent to the ground using rope slung from the helicopter overhead.

Suppression
The control and limitation of the progress of a wildfire once started. They key is the quickness and effectiveness of the suppression response following detection.

Type I-R Wildland Firefighting Unit
Helicopter-borne rappel (rapattack) unit trained to provide fast initial attack against wildfire, usually in remote areas and started by lightning.

Type I Helitack Wildland Firefighting Unit
Unit used primarily for initial attack on new wildfire starts; a well-prepared, mobile, highly-trained suppression force stationed around the province according to wildfire hazard ratings.

Type I Helitack Support Unit
Unit created in 2000 to support rapattack and helitack units, by continuing suppression activity so other units can return to initial attack duties.

Type II Wildland Firefighting Unit
Sustained action units located around the province and capable of carrying out wildfire control and suppression action on a sustained basis.

Type III Wildland Firefighting Unit
Emergency firefighters hired and trained each season to provide additional support in regions where hazard levels are such that suppression activities might exceed the locale's resources and capabilities. Used primarily for mop-up after a wildfire is brought under control.

Wildfire
A potentially costly wildfire caused by a lightning strike or some human activity.